

APPENDIX A
SAMPLING AND ANALYSIS PLAN

**APPENDIX A
SAMPLING AND ANALYSIS PLAN**

**FORMER GEORGIA-PACIFIC CALIFORNIA WOOD PRODUCTS
MANUFACTURING FACILITY
90 WEST REDWOOD AVENUE
FORT BRAGG, CALIFORNIA
AME PROJECT NO. 16017.01**

March 21, 2005

Prepared By

ACTON • MICKELSON • ENVIRONMENTAL, INC.
5175 Hillside Circle, Suite 100
El Dorado Hills, California 95762
(916) 939-7550

CONTENTS

	<u>Page</u>
LIST OF APPENDICES.....	ii
1.0 EXPLORATION BORING/SOIL SAMPLING PROCEDURES.....	A-1
1.1 Soil Sample Collection from Hollow-Stem Auger Borings	A-1
1.2 Sample Collection from Direct Push Borings.....	A-2
1.3 Sample Collection from Remedial Excavations	A-2
1.4 Concrete Sample Collection	A-2
2.0 MEASUREMENTS OF WATER LEVEL AND APPARENT THICKNESS OF PHASE- SEPARATED HYDROCARBONS (PSH, ALSO KNOWN AS LIQUID-PHASE HYDROCARBONS)	A-3
3.0 GROUND WATER SAMPLING.....	A-3
3.1 Well Evacuation.....	A-4
3.2 Low-Flow Well Evacuation (Measuring Dissolved Oxygen)	A-4
3.3 In-Situ Measurement of Dissolved Oxygen.....	A-4
3.4 Grab Ground Water Sampling	A-5
3.5 Sample Collection, Preservation, and Handling	A-5
4.0 DECONTAMINATION PROCEDURES	A-5
5.0 FIELD MEASUREMENTS	A-6
5.1 Buried Utility Locations	A-6
5.2 Lithologic Logging	A-6
5.3 Conductivity, Temperature, pH, Turbidity, and Dissolved Oxygen.....	A-6
5.4 In-Situ Dissolved Oxygen Meter	A-7
5.5 PID, FID, and LEL Meter Calibration	A-7
6.0 DISPOSAL PROCEDURES	A-7
7.0 SAMPLE CUSTODY	A-8
7.1 Field Custody Procedures	A-8
7.1.1 Field Documentation.....	A-8
7.1.2 Sample Labels.....	A-8
7.1.3 Field Notebook.....	A-8
7.1.4 Chain-of-Custody Record	A-9
7.1.5 Sample Transfer and Shipment.....	A-9
7.2 Laboratory Custody Procedures.....	A-10
7.3 Corrections to Documentation	A-10
7.4 Sample Storage and Disposal.....	A-10
8.0 SAMPLE ANALYSES.....	A-10
8.1 Soil and Concrete Samples	A-11
8.2 Ground Water Samples	A-11
9.0 REMARKS	A-11

LIST OF APPENDICES

APPENDIX A-1	BORING LOG KEY
APPENDIX A-2	UNIFIED SOIL CLASSIFICATION SYSTEM CHART

APPENDIX A

SAMPLING AND ANALYSIS PLAN

Proper sampling techniques must be followed so that samples represent actual field conditions and that samples are labeled, preserved, and transported properly to retain sample integrity. This appendix describes procedures to be followed by Acton • Mickelson • Environmental, Inc. (AME), during collection of concrete, subsurface soil and ground water samples and the analytical methodology to be utilized by the analytical laboratory. Sampling will be conducted in general accordance with procedure outlined in guidance documents from the American Society of Testing and Materials (ASTM), U.S. Environmental Protection Agency (EPA), and California Environmental Protection Agency (Cal-EPA).

1.0 EXPLORATION BORING/SOIL SAMPLING PROCEDURES

Soil borings and soil sampling will be performed under the direction of an appropriately registered AME professional. The soil borings may be advanced using either a truck-mounted, hollow-stem auger drill rig, or a direct push rig.

1.1 Soil Sample Collection from Hollow-Stem Auger Borings

Soil samples will be collected at five-foot vertical intervals. Soil sampling will be conducted in general accordance with ASTM D1586-84 (reapproved 1992), modified to allow the use of a 2-inch-diameter split-barrel sampler. Using this procedure, three 2-inch-diameter, 6-inch-length, brass tubes are placed in a California-type split-barrel sampler. The sampler is driven into the soil by a 140-pound weight falling 30 inches. After driving the sampler an initial set of 6 inches (seating drive), the number of blows required to drive the sampler an additional 12 inches is known as standard penetration resistance, or the "N" value. The "N" value is used as an empirical measure of the relative density of cohesionless soil and the consistency of cohesive soil.

Upon recovery of the split-barrel sampler, the brass tubes containing the soil will be removed. One of the three brass tubes will be sealed at the ends with Teflon[®] tape and plastic end caps. The percent recovery of the sample will be recorded. The sample will be labeled with an identification number, time, date, location, and requested laboratory analysis. The sample will then be placed in a plastic bag and stored at approximately 4 degrees Celsius (°C) in an ice chest for transport to the laboratory. Sample custody procedures outlined in Section 7.0 will be followed for each sample collection.

Soil in one of the brass tubes will be extracted upon recovery, placed in a plastic bag, sealed, and placed out of direct sunlight for later screening for organic vapors using a photoionization detector (PID) or a flame ionization detector (FID). The remaining portion of the soil sample will be examined and a complete log of soil conditions will be recorded on a soil boring log

(Appendix A-1) using the Unified Soil Classification System (USCS, Appendix A-2). The soil will be examined for composition, color, and moisture content.

The split-barrel sampler will be cleaned to prevent cross-contamination for each sampling interval using procedures described in Section 4.0.

Soil borings advanced with hollow-stem augers will generate drill cuttings. The soil generated from the soil borings will be stored in 55-gallon drums and labeled with the corresponding boring number, date, and address of the facility. Alternatively, the soil generated from the soil borings may be placed on and covered by plastic and stored onsite until characterized for disposal.

1.2 Sample Collection from Direct Push Borings

A continuous core will be collected in 4-foot long acrylic or polyvinyl chloride (PVC) tubes. Soil samples selected for laboratory analysis will be obtained by saw cutting a 6-inch long segment from the soil-filled acrylic tube and sealing the ends of the removed segment with Teflon[®] tape and plastic end caps. The sample will be labeled with an identification number, time, date, location, and requested laboratory analysis. The sample will then be placed in a plastic bag and stored at approximately 4 °C in an ice chest for transport to the laboratory. Sample custody procedures outlined in Section 7.0 will be followed.

1.3 Sample Collection from Remedial Excavations

Soil samples will be collected from Interim Remedial Measure (IRM) excavations to evaluate the residual concentrations of chemical compounds remaining in the soil. The samples will be collected directly from the excavator bucket to prevent physical hazards from personnel entering the excavations. Soil removed from the IRM excavation bottom or sidewalls will be placed in a brass tube filled such that no headspace exists. The ends of the tube will be covered with Teflon sheets then by plastic end caps. The samples will be labeled with an identification number, time, date, location, and requested laboratory analysis. The samples will be placed in individual plastic bags and stored at approximately 4 °C in an ice chest for transport to the laboratory.

Soil generated during IRM excavations will be either loaded directly into trucks for transport to a disposal facility or placed on and covered by plastic sheeting pending disposal characterization.

1.4 Concrete Sample Collection

Concrete samples will be collected from building foundations during their excavation and removal. The foundations will be broken into small portions and stockpiled onsite pending waste disposal characterization. Samples of the concrete will be collected for laboratory analysis from the stockpiles. Fragments of the concrete will be collected and double-bagged in sealed plastic bags to prevent any spillage of material during transport. Laboratory test samples will be sent to a materials testing (geotechnical) laboratory and crushed in preparation for chemical analysis. In accordance with analytical laboratory recommendations, the crushed samples will be stored at approximately 4 °C in an ice chest during laboratory shipment. Each sample will be labeled with an identification number, time, date, location, and requested laboratory analysis. Chain-of-custody documentation will be maintained for the samples from the time of collection to delivery to the laboratory. Following disposal characterization, non-hazardous concrete waste

will be crushed and utilized onsite or loaded (uncrushed) into trucks for transportation to Norcal Rock in Willits, California, an offsite recycling/disposal facility. Concrete containing chemical concentrations deemed hazardous will be transported to a Class I landfill for disposal.

2.0 MEASUREMENTS OF WATER LEVEL AND APPARENT THICKNESS OF PHASE-SEPARATED HYDROCARBONS (PSH, ALSO KNOWN AS LIQUID-PHASE HYDROCARBONS)

Phase-separated hydrocarbons have been reported in Parcel 5 monitoring well MW-5.1. Measurements of water level and apparent thickness of PSH will be conducted in general accordance with ASTM D4750 (reapproved 1993). The static water level and apparent PSH thickness in each well will be measured with an electronic interface probe prior to purging or sampling. The wire of the interface probe is marked at 0.01 foot intervals. One tone is emitted from the interface probe if PSH is encountered; another tone for water. The wire of the interface probe will be lowered slowly until PSH or water is encountered. At this point, the mark on the interface wire opposite the permanent reference point on the top of the well casing will be read to the nearest 0.01 foot and recorded. If the first encountered substance is PSH, the probe will be lowered until the tone corresponding to water is emitted. This depth will also be recorded. The difference between the two depths corresponds to the apparent PSH thickness. The interface probe will be rinsed in a cleaning solution and deionized water between measurements in different wells.

Sampling of PSH for analysis will not be performed. Further, no attempt will be made to sample or analyze ground water from monitoring wells where the presence of a measurable PSH layer is indicated by interface probe readings.

For sites where PSH is not present, either a conductance probe level meter or an electronic interface probe will be used to measure static water level. The conductance probe level meter emits a steady tone upon encountering any conductive fluid (i.e., water). Like the interface probe, the wire of the conductance probe level meter has markings at 0.01 foot intervals, and the procedure for obtaining static water levels with the conductance probe level meter is basically the same as for an interface probe when PSH is not encountered.

A permanent reference point will be marked on the well casings. The permanent reference point on the well casings will be surveyed to a common reference point. All well casing riser elevations will be known to within 0.01 foot.

3.0 GROUND WATER SAMPLING

Ground water sampling will be conducted in general accordance with ASTM D4448 (reapproved 2001). When ground water monitoring wells are accessed the wellhead atmosphere will be monitored by FID or lower explosive limit (LEL) meter. If monitoring indicates greater than 5,000 parts per million by volume (ppmv) with the FID or greater than 10 percent with the LEL meter, dry ice will be placed in the wellhead to displace the potentially explosive vapors and sampling will not proceed until concentrations are reduced below the action levels.

3.1 Well Evacuation

Stagnant water will be removed from the well casing and the surrounding gravel pack by bailing, pumping, or with a vacuum truck prior to collection of a ground water sample. At least three casing volumes of water will be removed from each well from which a sample is to be collected (unless low-flow purging is performed for measurement of dissolved oxygen as described in Section 3.2. The volume of water in the casing will be determined from the known elevation of the water surface, the well bottom elevation (as measured when the well is installed), and the well diameter.

If the well is bailed or pumped during purging, samples will be collected and field analyzed for pH, temperature, turbidity, and specific conductance. The well will be considered stabilized when repeated readings of the following parameters are within the ranges indicated as follows:

- | | |
|------------------------|----------------------------------|
| • Specific conductance | ±10 percent of the reading range |
| • pH | ±0.1 pH unit |
| • Temperature | ±0.5° C |
| • Turbidity | <5 nephelometric turbidity units |

After stabilization, and after at least three casing volumes are evacuated, a sample will be collected for analysis. The field container used for well stabilization measurements, and the pH, temperature, and conductivity probes will be rinsed between wells with deionized water.

All purge water will be containerized and documented for disposal as described in Section 6.0. If the containers are stored onsite, a label specifying the date of purging, source, and the known or suspected nature of the contents will be affixed to each container.

3.2 Low-Flow Well Evacuation (Measuring Dissolved Oxygen)

Where measurement of dissolved oxygen concentration is necessary, a low-flow purging method is used in general accordance with ASTM D6771 (2002). Ground water is removed from the well at a rate of 0.25 gallon per minute or less. The ground water purge flow is directed into a flow-through sampling chamber containing a field analyzer for dissolved oxygen. The well is considered stabilized and the dissolved oxygen concentration recorded when repeated measurements of dissolved oxygen are within a range of 0.1 milligram per liter (mg/L). The well can then be sampled from a sampling port in the inlet line to the flow-through sampling chamber, even if less than three casing volumes of ground water are removed.

3.3 In-Situ Measurement of Dissolved Oxygen

Measurement of dissolved oxygen in ground water may be performed in-situ with a dedicated field instrument. The instrument probe is lowered for placement within the screened interval of the monitoring well, and typically remains undisturbed throughout a test. Measurements are performed according to the specific instrument instructions.

3.4 Grab Ground Water Sampling

Grab ground water samples may be obtained with an exposed-screen sampling apparatus in general accordance with ASTM D6001 (reapproved 2002). At the target interval, an exposed-screen sampler will be opened to the formation from which a grab ground water sample will be collected with either a disposable, dedicated bailer or a stainless steel bailer. The sample is then transferred to the laboratory-supplied containers. If a stainless steel bailer is used for the sample collection, the bailer will be cleaned before each sampling event according to the procedures described in Section 4.0.

3.5 Sample Collection, Preservation, and Handling

A new polyethylene disposable bailer will be used to collect ground water samples after standard well evacuation or for grab sampling. The bailer is attached to a new disposable rope and lowered slowly into the water to avoid agitation of the collected sample. In low-flow evacuation, samples are collected from a sampling port in the inlet line to the flow-through chamber with the well evacuation pump operating. Containers for volatile organic compound analysis will be filled so that no air space remains in the vial after sealing.

All sample containers will be prewashed and prepared in accordance with quality assurance/quality control protocols of the laboratory. Only sample containers appropriate for the intended analyses will be used.

After sample collection, the samples will be sealed in zip press bags and then placed into coolers with ice packs. Internal temperature of the cooler will be maintained at approximately 4° C. Samples will be kept in coolers during transport to the analytical laboratory.

4.0 DECONTAMINATION PROCEDURES

All equipment that comes in contact with potentially contaminated soil, drilling fluid, air, or water will be decontaminated before each use in general accordance with ASTM D5088. Decontamination will consist of steam-cleaning, a high-pressure, hot-water rinse, or trisodium phosphate (TSP) or Alconox[®]/Liquinox[®] wash and fresh water rinse, as appropriate.

Drilling and sampling equipment will be decontaminated as follows:

1. Drill rig augers, drill rods, and drill bits will be steam-cleaned prior to use and between borings. Visible soil, grease, and other impurities will be removed.
2. Soil sampling equipment will be steam-cleaned prior to use and between each boring. Prior to individual sample collection, any sampling device will also be cleaned in a TSP or Alconox[®]/Liquinox[®] solution and rinsed twice in clean water. Any visible soil residue will be removed.

3. It is anticipated that disposable equipment will be used to collect water samples. If disposable equipment is not used, water sampling equipment will be decontaminated using methods described in Item 2 above for soil sampling equipment.
4. Water sampling containers will be prepared in accordance with the respective analytical laboratories quality assurance/quality control procedures.
5. Stainless steel or brass soil sampling tubes will be steam-cleaned or washed in TSP or Alconox[®]/Liquinox[®] solution and rinsed with clean water.
6. Field monitoring equipment (pH, conductivity, or temperature probes) will be rinsed with clean water prior to use and between samples.

5.0 FIELD MEASUREMENTS

Field data will be collected during various sampling and monitoring activities; this section describes routine procedures to be followed by personnel performing field measurements. The methods presented below will be followed so that field measurements are consistent and reproducible when performed by various individuals

5.1 Buried Utility Locations

All work associated with soil borings will follow the pre-drilling protocol specified in the Site Health and Safety Plan (Appendix B).

5.2 Lithologic Logging

A log of soil conditions encountered during drilling and sample collection (Appendix A-1) will be maintained using the USCS (Appendix A-2) by an AME geologist. All boring logs will be reviewed by a California registered geologist.

The collected soil samples will be examined and the following information recorded: boring location, sample interval and depth, blow counts, color, soil type, moisture content (qualitative), and depth at which ground water (if present) is first encountered. Also recorded on the soil boring logs will be the field screening results obtained using a portable PID or FID.

5.3 Conductivity, Temperature, pH, Turbidity, and Dissolved Oxygen

Specific conductance, water temperature, pH, turbidity, and dissolved oxygen measurements will be made when a water sample is collected. For standard well evacuation, a representative water sample will be placed in a transfer container used solely for field parameter determinations. For low-flow evacuation, measuring instruments will be placed in the flow-through sampling cell.

Combination instruments capable of measuring any or all of the parameters may be used. All instruments will be calibrated in accordance with manufacturer methods. The values for conductivity standards and pH buffers used in calibration will be recorded daily in a field notebook.

The dissolved oxygen meter is zeroed with a solution of 50 grams sodium sulfite in one liter of distilled water. Temperature measurements may be checked using standard thermometers. All probes will be cleaned and rinsed with fresh water prior to any measurements, in accordance with Section 4.0.

5.4 In-Situ Dissolved Oxygen Meter

A dissolved oxygen meter with a probe designed for stagnant water measurement will be used. The meter will be calibrated twice per day – before the first use and after the last use in accordance with the manufacturer instructions.

5.5 PID, FID, and LEL Meter Calibration

Field personnel will calibrate the PID, FID, and LEL meters for vapor measurements at least twice per day – before the first use and after the last use. The FID and LEL meters will be calibrated to a methane-in-air standard obtained from a calibration gas cylinder. The primary FID meter calibration point will be 200 ppmv methane (low range) and the primary LEL meter calibration point will be 50 percent of LEL (2.5 percent by volume or 25,000 ppmv methane). The FID may be alternately calibrated (on the high range setting) to 5,000 ppmv methane, using 10 percent LEL (0.5 percent by volume) calibration gas. The PID meter will be calibrated to an isobutylene-in-air standard of 100 ppmv obtained from a calibration cylinder. The PID, FID and LEL meters are zeroed on ambient air.

6.0 DISPOSAL PROCEDURES

Soil and fluids that are produced and/or used during the installation and sampling of borings and monitoring (or other) wells, and that are known or suspected to contain potentially hazardous materials, will be contained during the above operations. These substances will be retained onsite in appropriate containers (i.e., drums, bins, tanks) until chemical testing has been completed to determine the proper means of off-site disposal. Handling and disposal of substances known or suspected to contain potentially hazardous materials will comply with the applicable regulations of the Cal-EPA, the California Department of Water Resources, and any other applicable regulations.

Ground water encountered in excavations during foundation removal or IRMs will be containerized onsite pending chemical testing for disposal characterization. Water will initially be pumped into drums or temporary holding tanks. Dewatering of excavations is not anticipated to be necessary as efforts will focus on removing environmentally impacted soil and concrete above the water table only. Water generated from these operations will be handled for disposal as described above.

Residual substances generated during cleaning procedures that are known or suspected to contain potentially hazardous materials will be placed in appropriate containers until chemical testing has been completed to determine the appropriate means for their offsite disposal.

As described in Appendix E, Transportation Plan, non-hazardous soil will be transported to either Waste Management, Inc., Redwood Landfill in Novato, California or Potrero Hills Landfill in Suisun City, California. Hazardous soil will be transported to Waste Management, Inc., Kettleman

Hills Landfill in Kettleman City, California. Both non-hazardous and hazardous liquids will be transported to Evergreen Environmental Services in Newark, California for recycling.

7.0 SAMPLE CUSTODY

This section describes standard operating procedures for sample custody and custody documentation. Sample custody procedures will be followed through sample collection, transfer, analysis, and ultimate disposal. Sample custody procedures are to be followed so that (1) the integrity of samples is maintained during their collection, transportation, and storage prior to analysis and (2) post-analysis sample material is disposed in an appropriate manner. Sample custody is divided into field procedures and laboratory procedures, as described below.

7.1 Field Custody Procedures

Sample quantities, types, and locations will be determined before the actual fieldwork commences. As few people as possible will handle samples. The field sampler is personally responsible for the care and custody of the collected samples until they are transferred.

7.1.1 Field Documentation

Each sample will be labeled and sealed immediately after collection. Sample identification documents will be prepared so that identification and chain-of-custody records can be maintained and sample disposition can be controlled. Forms will be filled out with waterproof ink. The following sample identification documents will be utilized.

- Sample labels
- Field notebook
- Chain-of-custody forms

7.1.2 Sample Labels

Sample labels provide identification of samples. Preprinted sample labels will be provided. Where necessary, the label will be protected from water and solvents with clean label-protection tape. Each label will contain the following information:

- Name of collector
- Date and time of collection
- Place of collection
- AME project number
- Sample number
- Preservative (if any)

7.1.3 Field Notebook

Information pertinent to a field survey, measurements, and/or sampling will be recorded in a bound notebook or on the daily field log. Entries in the notebook should include the following:

- Name and title of author, date and time of entry, and physical/environmental conditions during field activity
- Location of sampling or measurement activity
- Name(s) and title(s) of field crew
- Type of sampled or measured media (e.g., soil, ground water, concrete, etc.)
- Sample collection or measurement method(s)
- Number and volume of sample(s) taken
- Sample containers and container batch numbers
- Description of sampling point(s)
- Description of measuring reference points
- Date and time of collection or measurement
- Sample identification number(s)
- Sample preservative (if any)
- Sample distribution (e.g., laboratory)
- Field observations/comments
- Field measurements data (pH, etc.)

7.1.4 Chain-of-Custody Record

A chain-of-custody record will be filled out for and will accompany every sample and every shipment of samples to the analytical laboratories in order to establish the documentation necessary to trace sample possession from the time of collection. The record will contain the following information:

- Sample or station number or sample I.D.
- Signature of collector, sampler, or recorder
- Date and time of collection
- Place of collection
- Sample type
- Signatures of persons involved in the chain of possession
- Inclusive dates of possession

The laboratory portion of the form should be completed by laboratory personnel and will contain the following information:

- Name of person receiving the sample
- Laboratory sample number
- Date and time of sample receipt
- Analyses requested
- Sample condition and temperature

7.1.5 Sample Transfer and Shipment

Samples will always be accompanied by a chain-of-custody record. When transferring samples, the individuals relinquishing and receiving the samples will sign, date, and note the time on the chain-of-custody record. Samples will be packaged for shipment and dispatched to the identified laboratory for analysis. The chain-of-custody record will accompany each shipment. The method

of shipment, courier name(s), and other pertinent information will be entered in the chain-of-custody record.

7.2 Laboratory Custody Procedures

A designated sample custodian will accept custody of the shipped samples and verify that the information on the sample label matches that on the chain-of-custody record. Information regarding method of delivery and sample conditions will also be checked on the chain-of-custody record. The custodian will then enter the appropriate data into the laboratory sample tracking system. The laboratory custodian may use the sample number on the sample label or may assign a unique laboratory number to each sample. The custodian will then transfer the sample(s) to the proper analyst(s) or store the sample(s) in the appropriate secure area. In the event of sample leakage or other evidence of damage to a sample, the laboratory will contact the project quality assurance officer for a decision regarding sample disposition.

Laboratory personnel are responsible for the care and custody of samples from the time they are received until the sample is exhausted or disposed. Once at the laboratory, the samples are handled in accordance with EPA SW-846, Test Methods for Evaluating Solid Waste Physical/Chemical Methods, Third Edition, for the intended analyses. All data sheets, chromatographs, and laboratory records will be filed as part of the permanent documentation.

7.3 Corrections to Documentation

Original data recorded in field notebooks, chain-of-custody records, and other forms should be written in ink. These documents should not be altered, destroyed, or discarded, even if they are illegible or contain inaccuracies that require a replacement document.

If an error is made or found on a document, the individual making the corrections will do so by crossing a single line through the error, entering the correct information, and initialing and dating the change. The erroneous information will be obliterated. Any subsequent error(s) discovered on a document will be corrected. All corrections will be initialed and dated.

7.4 Sample Storage and Disposal

Samples and extracts should be retained by the analytical laboratory for 30 days after receipt. Unless notified by the program manager, excess or unused samples should be disposed by the laboratory in an appropriate manner consistent with applicable government regulations.

8.0 SAMPLE ANALYSES

Implementation of the Work Plan at the site will result in the collection of soil, concrete and ground water samples. Analytical methods are discussed for each matrix type in the following sections. Analytical method reporting limits and holding times are described in the Quality Assurance Plan, Appendix C.

8.1 Soil and Concrete Samples

Soil samples may be collected in brass or acrylic or PVC tubes during soil boring activities as described in Section 1.0. Concrete samples will be collected in plastic bags and, after crushing at the materials testing facility, will be placed in brass tubes or sealed glass jars. Samples will be analyzed by one or more of the following test methods:

- Total petroleum hydrocarbons as gasoline, diesel, and motor oil (EPA Method 8015 Modified)
- Total petroleum hydrocarbons as diesel with silica gel cleanup (EPA Method 8015 Modified) – Extended Chromatogram
- Total oil and grease (EPA Method 1664A)
- Volatile organic compounds (EPA Method 8260)
- Volatile organic compounds (EPA Method 8260 with sample collection by EPA Method 5035)
- Semi-volatile organic compounds (EPA Method 8270)
- Polynuclear aromatic hydrocarbons (EPA Method 8310)
- Polychlorinated biphenyls (EPA Method 8080 or 8082)
- Organochlorine pesticides (EPA Method 8081)
- Dioxins and furans (EPA Method 8280 or 8290)
- Site specific pesticides/herbicides (no EPA Method)
- CAM 17 Metals (EPA 6010/7400)
- Hexavalent chromium (EPA Method 7196)
- Tannin and lignin (to be determined)

In addition to the chemical analyses, selected soil samples may be analyzed for physical parameters by the following ASTM methods or equivalent: dry bulk density and moisture content (ASTM D2937), total porosity (ASTM D854 and D2937), and total organic carbon (ASTM D2974).

8.2 Ground Water Samples

Ground water samples may be collected from existing monitoring wells and soil borings as grab ground water samples. Samples will be analyzed by one or more of the test methods listed in section 8.1.

9.0 REMARKS

This plan represents our professional opinions, which are based in part on information supplied by the client. These opinions are based on currently available information and have been arrived at in accordance with currently accepted hydrogeologic and engineering practices at this time

and location. Other than this no warranty is implied or intended. Any reliance on the information contained herein by third parties is at such party's sole risk.

APPENDIX A-1
BORING LOG KEY

BORING LOG KEY

LOCATION INFORMATION

ACTON • MICKELSON • ENVIRONMENTAL, INC.

5049 Robert J. Mathews Parkway #200
El Dorado Hills, CA 95762

DRILLING INFORMATION

DATE AND TIME OF DRILLING

BORING DESIGNATION

LOG OF BORING

Area No./ Description: _____

Drilling Company: _____

Drilled By: _____

Drilling Method: _____

Boring Diameter: _____

Sampling Method: _____

Drilling Started: _____

Drilling Finished: _____

Source: _____

AME PROJECT NUMBER

FACILITY NAME AND ADDRESS

Facility: _____

Address: _____

AME Project No.: _____

Page 1 of 1

DEPTH (feet)	SAMPLE INTERVAL	BLOW COUNTS		SOIL DESCRIPTION SOIL NAME, COLOR, RELATIVE DENSITY OR CONSISTENCY, MOISTURE, PARTICLE SIZE RANGE, OTHER	GRAPHIC LOG	SOIL CLASS	WELL GRAPHIC	COMMENTS DRILLING RATE AND CONDITIONS, WATER DEPTH, BACKFILL	FIELD PID/FID READING (ppm)
		SAMPLE ID (% FILLED)	BLOWS/6 IN. (N)						
0									
5									
10									
15									
20									
25									
30									

HAND AUGER

ROCK CORE

STANDARD PENETRATION TEST (SPT)

CALIFORNIA MODIFIED SPLIT SPOON SAMPLER

PUNCHLINE CORE

SAMPLE PORTION RETAINED FOR ANALYSIS

INDICATES A CHANGE IN SOIL PROPERTIES

INDICATES AN INTERVAL WITHIN A SOIL CLASS

COMPLETE SAMPLE IDENTIFIER, AND PERCENT OF SAMPLE TUBE FILLED WITH SOIL (OPTIONAL)

BLOW COUNT FROM SPT OR CAL. MOD. SAMPLER AND N-VALUE (SUM OF LAST TWO 6" INTERVALS)

INCHES RECOVERED FROM SAMPLER

GROUND WATER ELEVATION

GRAPHIC LITHOLOGY PER USCS CHART

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) CODE

GRAPHIC OF WELL CONSTRUCTION (IF APPLICABLE)

PID/FID READINGS FROM SOIL SAMPLES, IN PARTS PER MILLION (ppm)

REVISED LOG 2100203.GPJ ACTON.GBT 8/20/99

APPENDIX A-2

UNIFIED SOIL CLASSIFICATION SYSTEM CHART

UNIFIED SOIL CLASSIFICATION SYSTEM CHART

MAJOR DIVISION			SYMBOL		GROUP NAME ^A AND TYPICAL DESCRIPTION
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS		GW ^B	WELL-GRADED GRAVEL ^C : GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		(LESS THAN 5% FINES)		GP ^B	POORLY-GRADED GRAVEL ^C : GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES		GM ^B	SILTY GRAVEL ^C : GRAVEL - SAND - SILT MIXTURES
		(MORE THAN 15% FINES)		GC ^B	CLAYEY GRAVEL ^C : GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SANDS		SW	WELL-GRADED SAND ^D : GRAVELLY SANDS, LITTLE OR NO FINES
		(LESS THAN 5% FINES)		SP	POORLY-GRADED SAND ^D : GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES		SM	SILTY SAND ^D : SAND - SILT MIXTURES
		(MORE THAN 15% FINES)		SC	CLAYEY SAND ^D : SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	SILT ^E : INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	LEAN CLAY ^E : INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC CLAY/ORGANIC SILT ^E : ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT 50 OR GREATER		MH	ELASTIC SILT ^E : INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	FAT CLAY ^E : INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAY/ORGANIC SILT ^E : ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT: HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTES: A) IF FIELD SAMPLE CONTAINS COBBLES OR BOULDERS, ADD "WITH COBBLES" AND/OR "WITH BOULDERS" TO GROUP NAME

B) DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS WITH 5-15% FINES. ADD "WITH SILT" OR "WITH CLAY" TO GROUP NAME

C) IF SOIL CONTAINS 15% OR MORE SAND, ADD "WITH SAND" TO GROUP NAME

D) IF SOIL CONTAINS 15% OR MORE GRAVEL, ADD "WITH GRAVEL" TO GROUP NAME

E) IF SOIL CONTAINS 30% OR MORE PLUS NO. 200, ADD "SANDY" OR "GRAVELLY" TO GROUP NAME. IF 15-25%, ADD "WITH SAND" OR "WITH GRAVEL", WHICHEVER IS PREDOMINANT.